

CLAIMS:

1. A method for ensuring continuity of a communication session when a user equipment hands over from a first communication network to a second cellular communication network comprising the steps of:

performing an authentication procedure for a packet data session with a second communication network while still being attached to a first communication network, and

simultaneously performing a packet data session establishment procedure with the second communication network while still being attached to the first communication network.

2. A method as claimed in claim 1, wherein the step of performing the authentication procedure comprises authenticating the second communication network by a user equipment.

3. A method as claimed in claim 2, wherein the step of performing the authentication procedure comprises authenticating the user equipment by the second communication network.

4. A method as claimed in claim 1, further comprising the step of:
providing the first communication network comprising a WLAN network and the second communication network comprising a cellular network.

5. A method as claimed in claim 1, wherein the step of performing the authentication procedure comprises sending information by a user equipment for authentication and packet data session establishment, wherein the information travels either as a separate IP package or is piggybacked with existing signaling.

6. A method as claimed in claim 1, further comprising the step of:
configuring a gateway node between the first communication network and the second communication network to act as an access router for the first communication network and to host the packet data session in the second communication network.

7. A method as claimed in claim 1, further comprising the step of:
releasing a packet data session if a user equipment does not handover to the second cellular communication network within a predetermined time thus requiring the user equipment to repeat the authentication procedure if the user equipment is moving towards the second cellular communication network for a specified time.

8. A method as claimed in claim 1, further comprising the steps of:
(i) sending by a user equipment a handover trigger indication to a gateway node in the second cellular communication network, wherein the handover trigger indication comprises user equipment identification parameters and a packet data protocol profile;

(ii) sending by a gateway node the user equipment identification parameters and the packet data protocol profile to a serving node in the second cellular communication network;

(iii) contacting by the serving node a home location register to obtain user equipment authentication parameters;

(iv) sending by the serving node a packet data protocol profile request to the gateway node;

(v) responding by sending by the gateway node a packet data protocol profile response to the serving node;

(vi) sending by the serving node authentication information to the gateway node;

(vii) sending the gateway node the authentication information to the user equipment;

(viii) authenticating by the user equipment the second cellular communication network;

(ix) sending by the user equipment a response to the serving node and moving the user equipment into the second cellular communication network.

9. A method as claimed in claim 1, further comprising the steps of:

(i) sending by a user equipment a handover trigger indication to a gateway node in the second cellular communication network;

(ii) sending by the gateway node a protocol data unit notification request to a serving node in the second cellular communication network;

(iii) contacting by the serving node a home location register to obtain user equipment authentication parameters;

(iv) sending by the serving node a proxy authentication and a ciphering request to the gateway node;

(v) converting by the gateway node authentication information in the ciphering request which is then sent to the user equipment;

(vi) responding by the user equipment with an authentication message which is sent to the gateway node;

(vii) converting by the gateway node the authentication message from the user equipment and sending a proxy authentication and a ciphering response to the serving node;

(viii) sending by the serving node a protocol data unit notification response to the gateway node;

(ix) sending by the serving node a create packet data protocol request to the gateway node;

(x) sending by the gateway node a create packet data protocol response to the serving node; and

(xi) replying by the gateway node to the handover trigger indication sent by the user equipment by sending a handover trigger response to the user equipment.

10. A method for ensuring continuity of a communication session, the method comprising:

handing over by a user equipment from a first communication network to a second cellular communication network, and

when the user equipment hands over from the first communication network to the second cellular communication network, maintaining an attachment of the user equipment to the second cellular communication network after the user equipment moves away from a coverage area of the second cellular communication network for a predetermined time in order to allow the user equipment to return to the second cellular communication network without having to repeat an authentication procedure and a packet data session establishment procedure before handing over to the second network.

11. A method as claimed in claim 10, further comprising the step of: releasing a packet data session if the user equipment does not handover to the second cellular communication network within the predetermined time thus requiring the user equipment to repeat the authentication procedure if the user equipment is moving towards the second cellular communication network for a specified time.

12. A method as claimed in claim 10, further comprising the steps of:

(i) sending by the user equipment a handover trigger indication to a gateway node in the second cellular communication network, wherein the handover trigger indication comprises user equipment identification parameters and a packet data protocol profile;

- (ii) sending by a gateway node the user equipment identification parameters and the packet data protocol profile to a serving node in the second cellular communication network;
- (iii) contacting by the serving node a home location register to obtain user equipment authentication parameters;
- (iv) sending by the serving node a packet data protocol profile request to the gateway node;
- (v) responding by sending by the gateway node a packet data protocol profile response to the serving node;
- (vi) sending by the serving node authentication information to the gateway node;
- (vii) sending the gateway node the authentication information to the user equipment;
- (viii) authenticating by the user equipment the second cellular communication network;
- (ix) sending by the user equipment a response to the serving node and moving the user equipment into the second cellular communication network.

13. A method as claimed in claim 10, further comprising the steps of:

- (i) sending by the user equipment a handover trigger indication to a gateway node in the second cellular communication network;
- (ii) sending by the gateway node a protocol data unit notification request to a serving node in the second cellular communication network;
- (iii) contacting by the serving node a home location register to obtain user equipment authentication parameters;
- (iv) sending by the serving node a proxy authentication and a ciphering request to the gateway node;
- (v) converting by the gateway node authentication information in the ciphering request which is then sent to the user equipment;

(vi) responding by the user equipment with an authentication message which is sent to the gateway node;

(vii) converting by the gateway node the authentication message from the user equipment and sending a proxy authentication and a ciphering response to the serving node;

(viii) sending by the serving node a protocol data unit notification response to the gateway node;

(ix) sending by the serving node a create packet data protocol request to the gateway node;

(x) sending by the gateway node a create packet data protocol response to the serving node; and

(xi) replying by the gateway node to the handover trigger indication sent by the user equipment by sending a handover trigger response to the user equipment.

14. A communication system comprising a user equipment, a first communication network and a second cellular communication network, the system being arranged to:

enable continuity of a communication session when a user equipment moves from a coverage area of the first communication network to a coverage area of a second cellular communication network,

simultaneously perform an authentication procedure for a packet data session with the second cellular communication network and perform a packet data session establishment procedure with the second cellular communication network while the user equipment is still attached to the first communication network.

15. A communication system for ensuring continuity of a communication session when a user equipment hands over from a first

communication network to a second cellular communication network, the communication system comprising:

first performing means for performing an authentication procedure for a packet data session with a second communication network while still being attached to a first communication network, and

second performing means for simultaneously performing a packet data session establishment procedure with the second communication network while still being attached to the first communication network.